

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2019
(Fourth Semester)

Branch – MATHEMATICS

MATHEMATICAL STATISTICS - II

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 x 2 = 20)

- 1 Define sample and population.
- 2 Write the normal equations for $Y = a + bX$.
- 3 Define unbiased estimator.
- 4 Write the sufficient condition for consistent estimator.
- 5 Define MLE.
- 6 Define likelihood function.
- 7 What is mean by statistic and Parameter?
- 8 Define critical region.
- 9 Write any two uses of chi-square test.
- 10 Define F-test.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a Describe the method of selecting systematic sampling with example.
OR

- b Fit a straight line equation for the following data.

Year :	2006	2007	2008	2009	2010	2011
Sales :	7	9	12	15	18	23

- 12 a Show that the sample mean \bar{X} is an unbiased estimator of population mean μ .

OR

- b Write the regulatory conditions of Cramer Rao inequality.

- 13 a Write any five properties of MLE.

OR

- b Find the MLE of θ for the density function $f(x, \theta) = \theta e^{-\theta x}$.

- 14 a Explain briefly the two types of errors.

OR

- b Explain the procedure for testing the hypothesis.

Cont ...

- 15 a The means of two large samples of 1,000 and 2,000 items are 67.5 cms and 68 cms respectively. Can the sample be regarded as drawn from the population with standard deviation of 2.5 cms. Test at 5% level of significance?

OR

- b In a sample of 8 observations the sum of squares of deviations from mean was 84.4 and in another sample of 10 observations it was found to be 102.6. Test the difference in variance is significant at 5% level.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Fit a second degree parabola for the data given below.

X :	0	1	2	3	4
Y :	1	1.8	1.3	2.5	6.3

- 17 State and prove Rao Blackwell theorem.
- 18 Find the MLE for the parameter p in binomial population.
- 19 From the data given below about the treatment of 250 patients suffering from a disease, state whether the new treatment is superior to the conventional treatment

No. of patients

Type of treatments	Favorable	Not favorable	Total
New	140	30	170
Conventional	60	20	80
Total	200	50	250

- 20 A test is given to two group of students the marks obtained are as follows

I st Group :	10	12	13	11	14		
II nd Group :	8	9	12	14	15	10	9

Use t-test to examine the significant difference between the average marks obtained by two groups of students. (t-table value for 10 df at 5% level is 2.23).

Z-Z-Z

END